Jet Propulsion Laboratory
California Institute of Technology
4800 Oak Grove Drive
Pasadena, CA 91109-8099
(818) 354-4321

March 11, 2005
Refer to: 911–05–003–ESB

TO: Distribution

FROM: Eugene S. Burke

SUBJECT: February 08, 2005 Resource Allocation Review Board (RARB) Meeting Minutes

The following are the Minutes of the NASA/JPL Deep Space Network (DSN) Resource Allocation Review Board (RARB) Meeting held at JPL on February 8, 2005. The purpose of this Review is to address the oversubscription of the DSN 26/34/70-meter tracking assets. The Review Board consists of Project Managers, Project Scientists, and key JPL Interplanetary Network Directorate (IND) Deep Space Mission System (DSMS) Managers or their representatives. The Board is responsible for reviewing new or changed requirements, adopting recommendations to reduce periods of heavy contention, and for controlling changes to requirements. This Review was tasked to address contention in 2006, 2007, and 2008.

Review Board Members

The following Review Board Members or their representatives were in attendance:

Rich Miller	JPL	Acting Chairman
Gene Burke	JPL	Resource Allocation Planning & Scheduling Office Manager
Al Bhanji	JPL	DSMS Development, Operations and Service Office Manager
Amir Behrozi	JPL	Dawn Project Representative
Eugene Brower	JPL	Mars Global Surveyor Representative
Candace Carlisle	GSFC	ST-5 Deputy Project Manager
Pat Carr	ITT	ITT JPL Program Manager
Jim Erickson	JPL	Mars Exploration Rover Project Manager
Chad Edwards	JPL	IND Mars Network Office Manager
Bob Farquhar	APL	MESSENGER, New Horizons Project Representative
Stephen Gunter	JPL	Kepler Project Representative
Jared Hall	JPL	Deep Impact Project Representative
Dwight Holmes	JPL	Rosetta Project Representative
Chris Jacobs	JPL	Reference Frame Calibration Project Representative
Robert Lock	JPL	Mars Reconnaissance Orbiter Project Representative
Ed Massey	JPL	Ulysses/Voyager Project Manager
Bob Mase	JPL	Mars 2001 Odyssey Project Representative
Bob Mitchell	JPL	Cassini Program Manager
Steve Ostro	JPL	GSSR Project Scientist
Bob Ryan	JPL	Stardust Project Representative
Rance Skidmore	GSFC	GOES Project Representative

Martin Slade	JPL	GSSR Project Manager
Bob Sodano	GSFC	Space Science Mission Operations Project Representative (SOHO, WIND, Polar, Geotail, Cluster II, ACE, Image, MAP, STEREO)
Tommy Thompson	JPL	NASA Venus Express, Lunar-A and Hayabusa Project Manager Mars Express – U.S. Project Science Manager
Robert Wilson	JPL	Spitzer Project Manager
Pam Wolken	ITT	Radio Astronomy & Advanced Tracking and Observational Techniques Representative
Greg Wright	MSFC	Chandra Project Representative

Review Materials

All supporting material presented in the RARB Booklet as well as the NASA Headquarters material distributed during the meeting can be found at http://rapweb.jpl.nasa.gov/rarb.html.

Agenda

1. Introduction ..... R. Miller for B. Weber
2. Overview, Contention Summary ..... G. Burke
   - Action Items from August 2004 RARB ..... D. Morris
3. NASA Headquarters – Science Mission Directorate ..... C. Holmes
4. DSN Scheduling Reengineering Status Review ..... R. Miller/R. Bartoo
5. JPL DSMS Development Operations and Services Office ..... W. Sible
6. New Or Modified Project Requirements
   - Venus Express ..... T. Thompson
   - ST-5 ..... C. Carlisle/B. Shendock
   - Reference Frame Calibration ..... C. Jacobs
7. Resource Contention
   - Analysis & Recommendations ..... N. Lacey
   - Responses ..... Projects
   - Discussion / Decisions ..... All
8. New Action Items & Summary ..... G. Burke

Introduction – R. Miller, Acting, RARB Chairman

R. Miller welcomed the Review Board and thanked the mission representatives for attending the RARB. He also stated that during the next year and a half, the activity level for the DSN would be high and compounded by major downtimes for upgrades to the 70 Meter and 34 HEF antennas.

Noted that a report would be presented to the Board on the progress to perform a system level design of the DSN Scheduling System in order to enable process changes.

Overview, Contention Summary – G. Burke

The focus of RARB was to review and resolve contention periods for January 2006 through December 2008. He stated that the RAPSO team has worked closely with the individual projects to clear all of the contention periods. RARB Survey Results conducted at the August 2004 RARB were presented.

- Demographics:
  - 37% of Attendance response: (90% Project Staff with 38% Non-JPL)
- Continue Semi-Annual Meeting?
  - 95% Agreed or Strongly Agreed
- Keep High Priority Event Contention at RARB and Push Smaller Changes to monthly JURAP meeting?
  - 90% Agreed or Strongly Agreed
- Similar Results with the August 2000 Survey

Given the survey response and the progress achieved at the last two RARB's (last August and today), RAPSO is recommending holding an annual meeting with semi-annual analysis. A quick survey was conducted regarding when would be the best month for an RARB Meeting. By a show of hands, the attendees selected February. The August 2005 RARB Meeting will be cancelled and the next meeting will be February 2006. An evaluation of the August 2005 RARB Process (without meeting) will be presented at the February 2006 RARB.

Proposed Changes to the DSN 2005 Implementation Downtimes Schedule were discussed.

August 2004 RARB Action Items Review – D. Morris

Reported that the three August Action Items were closed and presented the following summary:

- Action Item 1 regarded the high load on DSS-14 during July and August 2006. The Principle Scientist agreed with the updated recommendations.
- Action Item 2 regarded the high load during August and September 2006. The Mars Program Office will coordinate MRO, MGS, MEX and Odyssey support to optimize use of MSPA.
- Action Item 3 regarded the high load on the 70M subnet during December 2006. SOHO has clarified their 70M support requirements during this antenna keyhole event.

NASA Headquarters Perspective – Science Mission Directorate – C. Holmes

In his **Views from Washington** report, C. Holmes, of the Earth-Sun System Division, Science Mission Directorate, NASA Headquarters, reported on the Science Mission Directorate and listed the DSMS missions by Headquarters Science Theme as follows:

- Solar System
  - Mars, Cassini, Stardust, Messenger, Deep Impact, Rosetta, Hayabusa
  - More Mars, New Horizons, LRO, Dawn, Venus Express, SELENE, future Discovery and New Frontiers

- Universe
  - Chandra, WMAP, Spitzer, INTEGRAL, GP-B
  - Kepler, SIM, JWST, Con-X, TPF
- Sun-Earth System
  - Voyager, Ulysses, SOHO, ACE, Polar, IMAGE, Cluster, Wind, Geotail
  - Stereo, ST-5, Solar Probe, Sentinels, future MidEx

The suggested budget through 2010 was shown and he indicated that he did not have any additional information than that which is available to the public.

DSN Scheduling Reengineering Status Review – R. Miller

R. Miller indicated that the Operations Assessment Review recommendation prompted JPL to do a system level design of the DSN Scheduling System - which will enable process changes.

Conclusions from Value-Stream-Mapping and the RAP Working Group revealed the following: (1) Too labor intensive, too many meetings, and inadequate disjointed tools; (2) No silver bullet (directly applicable outside process or software); (3) No recommendation to depart from a collegial process; (4) Primary recommendation is better tools; and (5) Process changes suggested (beyond better tools).

Concept of Operation Service Scheduling Subsystem – R. Bartoo

R. Bartoo stated that during January, the Concept of Operations draft Document for the Scheduling Subsystem System was nearly 85% drafted, and is currently being edited by members of the user community and the DSN. When asked he said that this group was R. Herrera, K. Zamora, C. Chang and J. Breidenthal. The anticipated distribution date for review of the document is March 2005.

The system envisioned will: (1) be a web-based interactive system; (2) Support multiple simultaneous users; (3) Contain intuitive graphical user's interfaces and displays; and (4) Have only one Master Schedule Database accessible to all users.

The Next Steps will be to: (1) Perform alignment between the SSS Concept of Operations Document and the SSS Functional Requirements Document; (2) Update and release both if necessary; and (3) Conduct a Concept Review.

DSMS Development, Operations and Services Program Office (DDOSO) – W. Sible

The former Operations Office 930 and Engineering Office 940 have been integrated together to form Office 920. The four main offices are organized to provide a "cradle-to-grave" process flow. Additionally, there are two support groups – Development and Operations Engineering Staff. All offices have the following functions: Requirement analysis, low level requirements generation, development of trade-offs and cost estimating, selection of program work content in response to SE requirement, implementation and delivery, equipment operations and maintenance, monitoring of performance via DR (Discrepancy Report) analysis and mission feedback. The ITT (Prime DSN

Operations and Maintenance contractor) engineers are integrated into this structure.

Key Tasks to be completed in 2005:

- X/X/Ka-band feeds for BWG Antennas
  - DSS-34
- Antenna controllers for the 70m and 34m HEF
  - Will require significant downtime
- TTC UPL/DTT V5.5 & V5.7
- DSS-65 Relocation
- DSS-43 Hydrostatic Bearing Assembly (HBA) Task

Significant Operations Accomplishments from September 2004 through January 2005 include the extremely high quality support provided to Deep Impact Launch on January 12, 2005.

Significant Operations Plans through August 2005 include Cassini Encounters and Maneuvers, Rosetta EGA Closest Approach, Deep Impact Maneuvers, Impactor Release, Encounter & Playback, Messenger Maneuver & Earth Flyby, NOAA-N Launch, Stardust Maneuver, Voyager DTR Playback, GOES N Launch, and MRO Launch.

Venus Express Mission – T. Thompson

An overview of the Venus Express mission was presented. The ESA's Venus Express mission will revolutionize our understanding of the evolution of the Venusian's atmosphere; and satisfies many of the objectives identified in the Next Decadal Study. The mission's synergistic set of experiments measure key aspects of Venus encompassing: the surface, the middle and upper portions of the Venusian's atmosphere, and the interaction between the Venusian's atmosphere and the solar wind. The Venus Express mission is an important pathfinder for the Venus Sample Return mission. Venus Express is scheduled to launch October 26, 2005. The DSN is requested to support Launch and Orbit Insertion activities.

ST-5 Mission – C. Carlisle/ R. Shendock

An overview of the ST-5 mission requirements identified these key items:

1. Design, develop, integrate, test and operate three full service spacecraft, each with a mass less than 25kg, through the use of breakthrough technologies;
2. Demonstrate the ability to achieve accurate, research-quality scientific measurements utilizing a constellation of 3 nanosatellites, each with a mass less than 25-kg; and
3. Execute the design, development, test and operation of multiple spacecraft to act as a single constellation rather than as individual elements.

ST-5 launch timeframe is February 28 – March 31, 2006; launch site is Vandenberg AFB, Lompoc, CA; and the mission duration is 90 days.

Reference Frame Calibration – C. Jacobs

The importance of the DSN S/X and X/Ka Catalog Maintenance and Enhancement 24-hour requirements was discussed:

- DDOR Navigation
- Mars Ephemeris
- Calibrates: Earth Orientation and Station Locations
- Physical Models for upcoming DSN Array

It is anticipated that there will be future tracking requirements for 34 Meter BWG antennas using Ka-Band that will support increased spacecraft ephemeris accuracy.

After a spirited discussion with various projects/users representatives and numerous questions regarding impact to users if reduced support were garnered by RFC, an Action Item was proposed by C. Holmes, NASA Headquarters Representative.

Resource Contention Summary – N. Lacey

The changes since the August 2004 RARB were presented: Project Date Changes, Changes in DSN Resource Support, and the IND Resource Implementation Planning Matrix Changes. He also showed a graphic display of the DSN User / Mission Planning Set, and Major DSN Downtimes.

All Resource Analysis Team (RAT) Recommendations were accepted prior to today's meeting.

He noted that for source information regarding the complete "Red Book" click on the following URL: http://rapweb.jpl.nasa.gov/RARB-REDFeb2005.html

Summary – G. Burke

Burke thanked everyone for attending the meeting and announced that the next regular RARB meeting would convene February 14, 2006.

New Action Items

AI#	Year	Month(s)	System	Responsible	Due Date	Status
01	**2006-2008**	**All**	**RFC**	**B. Geldzahler**	**TBD**	**Open**

Action: Externally review the RFC requirements and implementations to understand impact to users.